

A NOTE ON EAST MEDITERRANIAN SPECIES OF THE GENUS
HAEMAPHYSALIS ⁽¹⁾*

B. FELDMAN-MUHSAM

Department of Parasitology, Hebrew University, Jerusalem

The descriptions of species within the genus Haemaphysalis are often incomplete and insufficient for specific diagnosis particularly in the case of Mediterranean species. This has resulted in considerable confusion and specific determination on the basis of extant literature is difficult. In this paper it is shown that by application of the characters used in the case of the genus Hyalomma it is possible to clear up this confusion and provide data for accurate specific diagnosis. This is essential in view of the fact that the genus Haemaphysalis contains proved carriers of rickettsiae and Babesia canis.

The following species of the genus *Haemaphysalis* have been recorded from the near East:

Haemaphysalis cinnabarina var. *punctata* (Canestrini, and Fanzago, 1877). Nuttall et al., 1915, from Egypt, Asia Minor, Macedonia and Crete;

H. spinigera Neuman, 1897 from "Judea";

H. leachi (Audouin, 1827) Neuman, 1897, from Egypt;

H. cornigera Neuman, 1897, from "Judea";

H. calcarata Neuman, 1902, from Egyptian Soudan;

H. punctata var. *cretica* Senevet and Caminopetros, 1936, from Crete;

H. otophila Schulze, 1918, from Macedonia.

Unfortunately the original descriptions of all the above mentioned species are vague and not based on decisive characters so that diagnosis is difficult and uncertain. It is probable that *H. punctata* var. *cretica* Senevet and Caminopetros, 1936¹, is a synonym of *H. nicolleti* Larousse, 1925². On the other hand the ticks included by Nuttall and Warburton³ in *H. cinnabarina punctata* contain in our opinion, three distinct species of which two *H. otophila* Schulze, 1918⁴, and *H. punctata* var. *cretica* have been collected in this country on different hosts. An examination of material in our collection

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has convinced us that the methods established for identification of species of the genus *Hyalomma* by Adler and Feldman-Muhsam^{5, 6} are useful for specific determination in the genus *Haemaphysalis* and are probably valid for other genera of the *Ixodidae* e.g. *Amblyomma* and *Dermacentor*⁷. Ambiguities in specific nomenclature in the genus *Haemaphysalis* can only be eventually cleared up by examining type material for constant characters particularly the genital aperture of the female. In the meantime we are compelled to use the incomplete taxonomic data available. In the present paper we present new data for the taxonomy of *H. punctata*, *H. cretica* and *H. otophila*, and add two new species: *H. adleri* and *H. erinacei*.

HAEMAPHYSALIS CRETICA (Senevet and Caminopetros, 1936) n. comb.

Synonymy:

H. cinnabarina var. *cretica* Senevet and Caminopetros, 1936,

H. punctata var. *cretica* Senevet and Caminopetros, 1936,

? *H. nicolleti* Larrouse, 1925.

Haemaphysalis cretica was described as a variety of either *H. punctata* or *H. cinnabarina* by Senevet and Caminopetros and in our opinion should be raised to specific status on the basis of distinctive taxonomic characters.

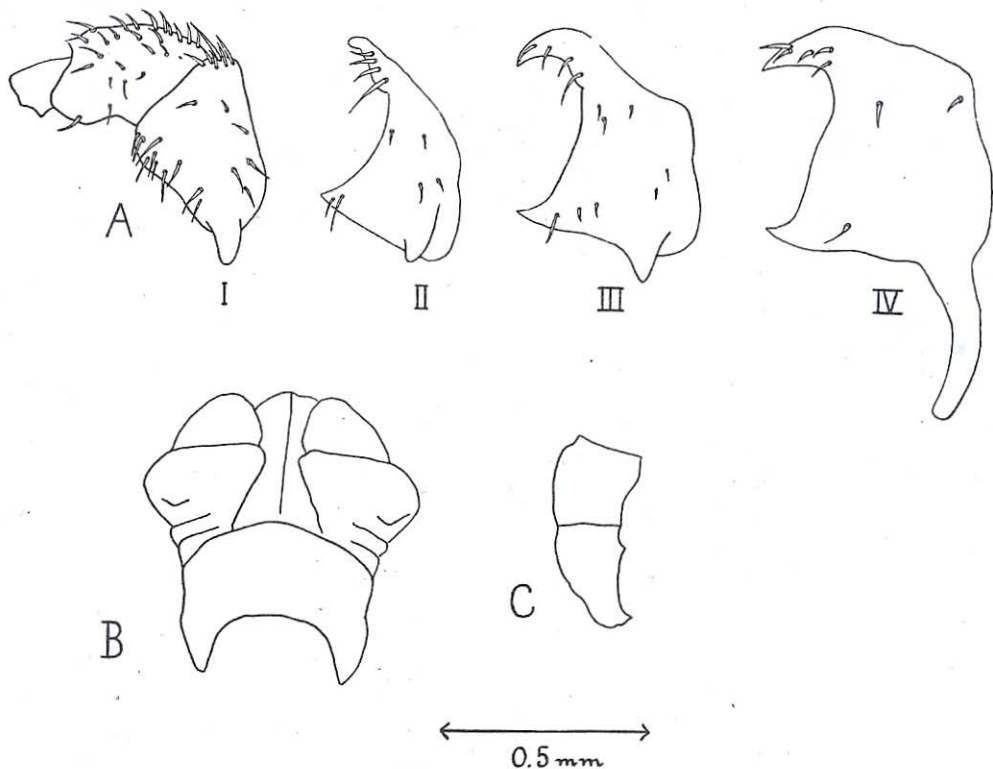


Fig. 1 *H. cretica* male: A — Coxae, B — Capitulum, C — Tarsus leg IV.

Male.

The male is characterized by an elongated scutum covered uniformly with small punctations. Its length from the middle of the line joining the tips of scapulae to the posterior margin is about 3.5 mm. The lateral grooves are sharply defined, very long and begin at the level between coxae II and III. The basis capituli is rectangular with long cornua. There is a strong ventral retrograde spur on article 3 of the palp. First coxa with a short spur. Coxa II and III with a short spur (sometimes very short). Coxa IV with a very long spur almost as long as the coxa, and always directed laterally (Fig. 1, A, IV). The trochanters, especially those of the first pair, are very pilose (Fig. 1, A.I.) The dentition of the hypostome is 5/5 or 6/6. The denticles become progressively larger from the distal to the proximal row.

Female.

The scutum is longer than broad and is covered uniformly with small punctations. Its length from the middle of the line joining the tips of the scapulae to the posterior margin is about 1.4 mm. The gorged female attains about 14 mm. in length. The basis

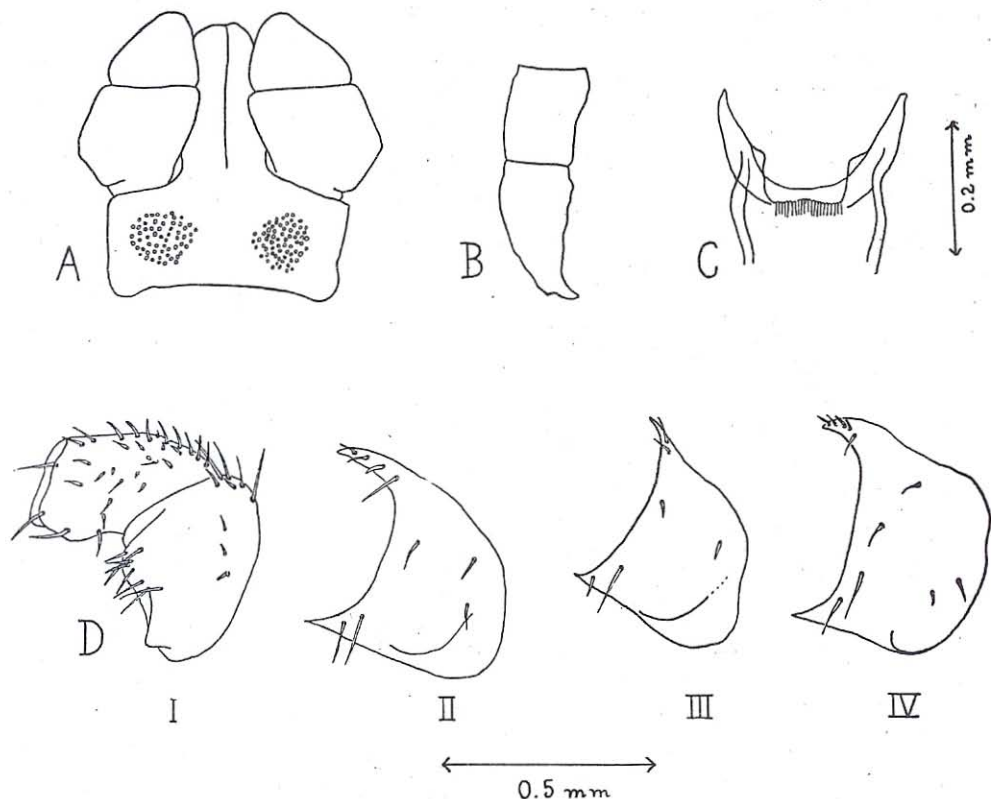


Fig. 2 *H. cretica* female: A — Capitulum, B — tarsus leg IV, C — Genital aperture, D — Coxae.

capitulum is rectangular. There are no cornua. There is a strong ventral retrograde spure on article III of the palps as in the male. Coxa I has a very short spur, Coxae II, III, and IV have only a bulge in place of a spur (Fig. 2,D). Occasionally the bulge on coxa IV is somewhat enlarged and directed laterally along the lower aspect of the coxa. The trochanters, especially of the first pair of legs are very pilose as in the male (Fig. 2,D,I). The dentition of the hypostome is 4/4 sometimes 5/5.

The sexual aperture of the female (Fig. 2,C) is characteristic and may be distinguished from other local species. The distance between the two lateral chitinous flaps is constantly relatively larger than in *H. otophila*. This species differs from *H. punctata* in the following details: the males of *H. cretica* seem to be somewhat larger (3,3-3,7 mm), the spur on the forth coxa is directed laterally, the trochanters are pilose. The cornua on the basis capituli are long. The length of the males of *H. punctata* ranges from 2,4-3,3 mm; the spur on the forth coxa is directed medially, and the cornua are shorter than in *H. cretica*. The female of *H. cretica* differs from that of *H. punctata* in the pilose trochanters, longer and stouter legs, and in the absence of spurs on coxae II and III (all the coxae of *H. punctata* bear well marked spurs).

H. cretica is apparently rare in Palestine. From a large collection of many thousands of ticks collected during two years (1928-29), made by the mandatory government of Palestine, only 240 specimens were found. The ticks were practically from all parts of the country. The hosts were goat, sheep, camel, and cow. The adult ticks are found on the hosts during the winter months (November-February) only.

Among *H. cretica* of our collection, 66% were taken from goat, 23% from sheep and the remaining 9% from cattle and camels. In view of the fact that more *Haemaphysalis* ticks had been collected from goat than from sheep, the above percentages may present an exaggerated picture of the actual preference of *H. cretica* for the goat. As a matter of fact, 46% of all *Haemaphysalis* ticks taken from goat were *H. cretica* while among *Haemaphysalis* ticks taken from sheep 26% proved to belong to this species. The difference between these percentages has been shown by χ^2 test to be highly significant statistically.

HAEMAPHYSALIS OTOPHILA Schulze, 1918.

Syn.: *H. cinnabarina* var. *punctata* (Canestrini and Fanzago, 1877) Nuttall et al., 1915, p.p.

This species was created by Schulze for specimens which he found in Macedonia on several hosts (cattle, sheep, goat, donkey and dog).

Nuttall described similar specimen from Transcaucasia and considered them as atypical forms of "*H. cinnabarina punctata*".

Schulze's description is not complete, but the characters of the capitulum and coxae as figured by him resemble those found in our material and differ from "*H. cinnabarina*

punctata especially by the absence of a long spine on the IV coxa of the male. The palps are less salient laterally than in *H. punctata*. The female differs from *H. punctata* in the short cornua which are absent in *H. punctata*.

Male.

Specimens are smaller than those of *H. cretica*. The length of the scutum of the male is about 2.3-2.6 mm. The colour of the scutum is red brown. It is uniformly covered with small punctations. The lateral grooves are long narrow and sharply defined. They begin at the level between coxae II and III. The basis capitulum is rectangular

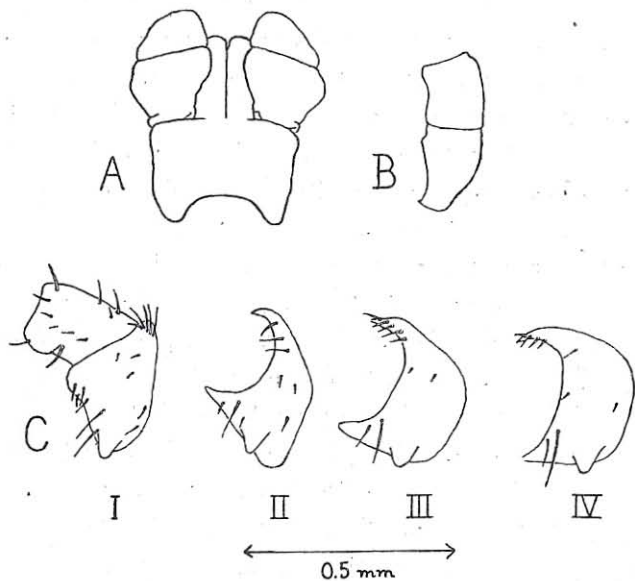


Fig. 3 *H. otophila* male: A—Capitulum, B—Tarsus leg IV, C—Coxae.

and has short cornua (Fig. 3,A). There is a retrograde spur on the ventral side of article 3 of the palp. The spurs on all coxae are small and about the same size. The hairs on the trochanters are scanty (Fig. 3,C,I). The dentition of the hypostome is 4/4, with an additional incomplete row (sometimes also 5/5). Corona distinct.

Female.

The female is much nearer to *H. punctata* than the male. The scutum is about 1.1-1.2 mm. in length, is longer than broad, its colour is reddish brown, and it is uniformly covered with small punctations. The basis capitulum is rectangular, with very short cornua. The second article of the palp is slightly notched on its lateral margin. The notch is situated above a small lateral projection (Fig. 4,A, compare with palpes of *H. cretica*). Article 3 bears ventrally a retrograde spur. All coxae bear short but well

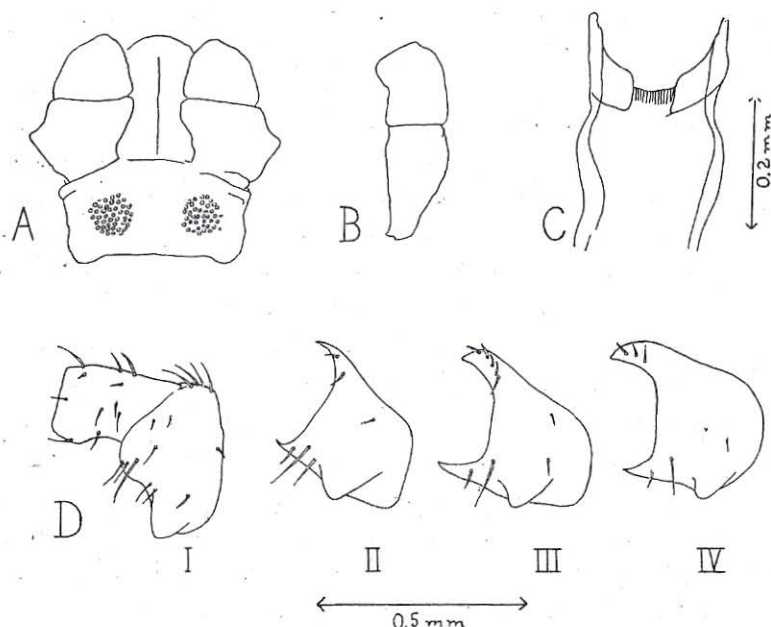


Fig. 4 *H. otophila* female: A — Capitulum, B — Tarsus leg IV, C — Genital aperture, D — Coaxe.

marked spurs. The hairs on the trochanters are scanty, as in the male. The dentition of the hypostome is 4/4. The genital aperture is specifically characteristic (Fig. 4,C). The distance between the median corners of the two lateral flaps is shorter than in *H. cretica*. The gorged female is smaller than that of *H. cretica* and does not attain more than 10 mm. This species is much more abundant in this country than *H. cretica* and was found on a greater variety of hosts viz. sheep, goat, camel, dog, cattle, mule, horse. Thirty eight per cent of the specimens in our collection were found on sheep and 33% on goats, 14% on cattle and the remaining 15% on various other animals. Taking into consideration as mentioned above that more *Haemaphysalis* ticks had been taken from goat than from sheep the above percentages do not reflect the actual preference of *H. otophila* for sheep. As a matter of fact, 74% of all *Haemaphysalis* found on sheep were *H. otophila* while 54% of those found on goat belong to this species. This difference between these percentages has been shown as mentioned above, to be highly significant statistically. The ticks are not found only in the ears as Schulze thought, but they can also be met with in the tail, under the belly, thighs, abdomen, udder and jaw. The ticks were found all over the country during the winter months October-February.

The distinct characters which readily distinguish between the females of *H. otophila* and *H. cretica* are: hairy trochanters, absence of the lateral projection on article two of the palp, small bulges on coxae II, III, IV, and the form of the genital aperture in *H. cretica*. In *H. otophila* the hairs on the trochanters are scanty; there is a small notch

above the lateral projection on the second article of the palp, and there are short spurs on all coxae.

HAEMAPHYSLAIS PUNCTATA Canestrini and Fanzago, 1877.

Syns.: *H. punctata punctata* (Canestrini and Fanzago, 1877) Neuman, 1911,

H. cinnabarina var. *punctata* (Canestrini and Fanzago, 1877) Nuttall *et al.*, 1915, p.p.

Neumann⁸ divided this species into 2 varieties, *H. punctata punctata* and *H. punctata cinnabarina*. Nuttall gives priority to Koch's type *cinnabarina* and reduces *H. punctata* to the status of a variety of *H. cinnabarina*, which is a South American species. Nuttall further considered *H. chordeilis* (recorded from U.S.A. and Canada) to be a synonym of *H. cinnabarina*. Cooley⁹ on the other hand retains the name *H. chordeilis* for North American specimens. Nuttall based his opinion on the re-examination of Koch's unique type of *H. cinnabarina*. We have had no opportunity of examining South American specimens but through the kindness of Dr. G.M. Kohls of the Rocky Mountain Laboratory we obtained specimens of *H. chordeilis* determined by him. A study of these specimens leaves no doubt that *H. punctata* is quite distinct from *H. chordeilis* both on gross characters and structure of the genital aperture of the female. These findings indicate that *H. punctata* is a distinct species and not a variety of *H. cinnabarina* or *H. chordeilis*.

H. punctata has not been found in the material so far collected in Palestine, but in view of the fact that Nuttall's descriptions of *H. punctata* is incomplete with regard to essential taxonomic characters and relates to at least three species, we think it useful to

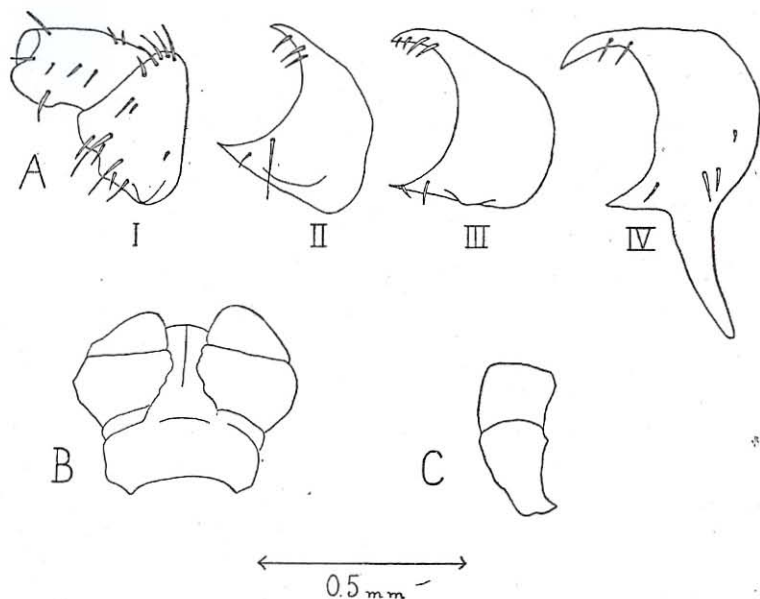


Fig. 5 *H. punctata* male: A — Coxae, B — Capitulum, C — Tarsus leg IV.

give a complete description on the basis of material kindly furnished by Prof. Ed. Sergent, the director of the Institut Pasteur of Algeria.

Male.

Scutum, oval, reddish brown in colour and about 2.3 mm in length; uniformly covered with small punctations. The lateral grooves are narrow and begin at the level between coxae II and III. The basis capituli is rectangular, with short cornua (Fig. 5, B). There is a short retrograde spur on the ventral side of article 3 of the palp. Coxae I, II and III bear short spurs, coxae IV bears a long spur, always directed medially (Fig. 5, A, IV). The hairs on the trochanters are as scanty as in *H. otophila* (Fig. 5, A, I). The dentition of the hypostome is 5/5, 8-9 teeth per file.

Female.

The scutum is longer than broad, and about 1.2 mm in length. The lateral margins of the scutum do not form a smooth curve posteriorly but as Nuttall remarks "is broken by slight posterolateral angles". The basis capituli is rectangular, with no cornua (Fig. 6, A). The areae porosae are very large and occupy almost the entire basis capituli. Article 3 of the palp bears ventrally a short retrograde spur. All coxae bear short but well marked spurs. The spur on coxa IV is sometimes somewhat longer than on II and III. The hairs on the trochanters are scanty as in the male. The dentition of the hypostome is 5/5 (sometimes there is an additional incomplete row) 11-13 teeth per file. The genital aperture is specifically characteristic (Fig. 6, C). The lateral flaps are thin.

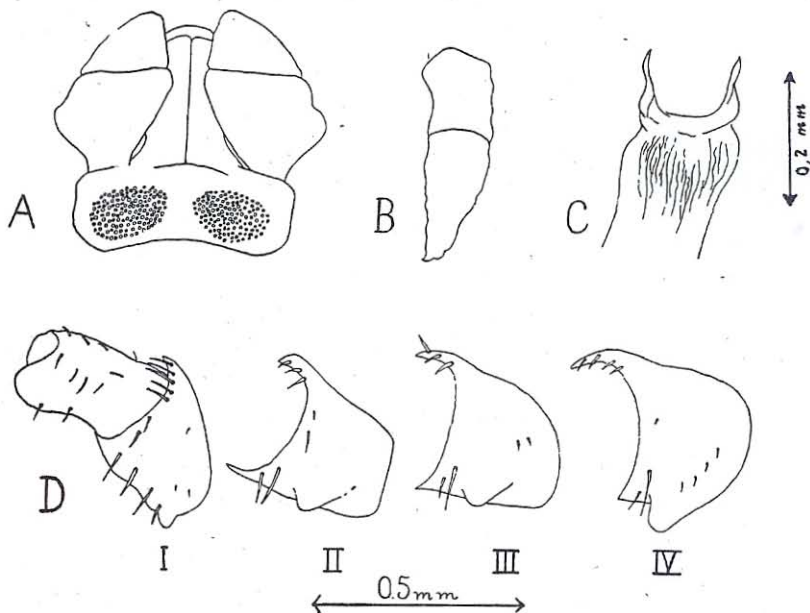


Fig. 6 *H. punctata* female: A — Capitulum, B — Tarsus leg IV, C — Genital aperture, D — Coxae.

HAEMAPHYSALIS ADLERI n. sp.

This species resembles *H. leachi* in some respects, especially in the form of the capitulum, but differs in some essential features and should therefore be considered as a new species.

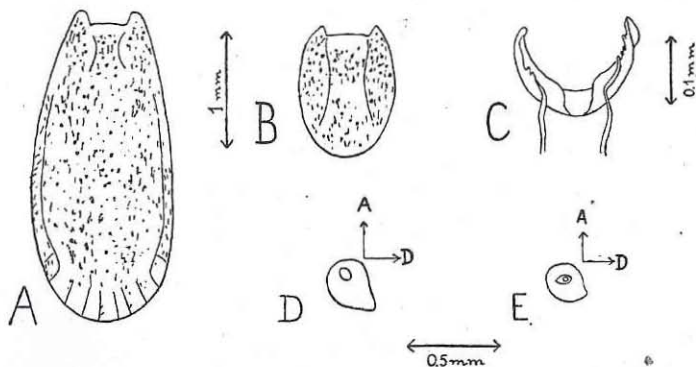


Fig. 7 *H. adleri*: A—Male scutum, B—Female scutum, C—Female genital aperture, D—Male spiracular plate, E—Female spiracular plate.

Male.

It is a small tick. The length of the scutum is about 2.2 mm. The scutum is long oval, with many large punctations. Lateral grooves are long and distinct, they begin at the level between coxae II and III and include 2 festoons. The median festoons are twice as long as broad. The whole scutum is covered with numerous long hairs (Fig. 7, A). The palps meet anteriorly at a very obtuse angle. Article two of the palp is very salient laterally and with retrograde projections, 2 dorsal, and 1 ventral (Fig. 8 A and B). The

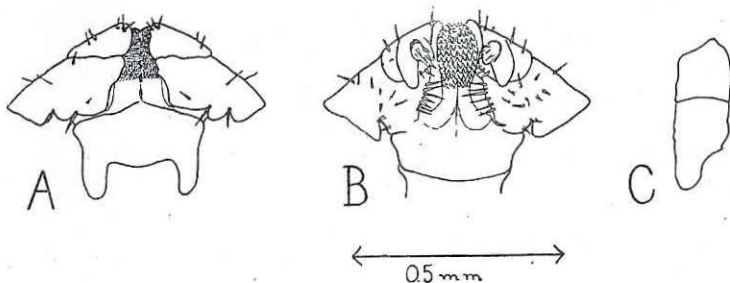


Fig. 8 *H. adleri* male. A—Capitulum dorsum, B—Capitulum venter, C—Tarsus leg IV.

basis capituli is broadest in front. The cornua are strong and long. Article 3 of the palp bears ventrally a retrograde process. The dentition of the hypostome is 4/4, 7 teeth per file. All coxae have small spurs on their medial aspect.

Female.

The scutum is elongated, oval in shape with numerous large punctations. It is covered with long hairs as in the male (Fig. 7, B). Its length is about 0.9 mm. The palps

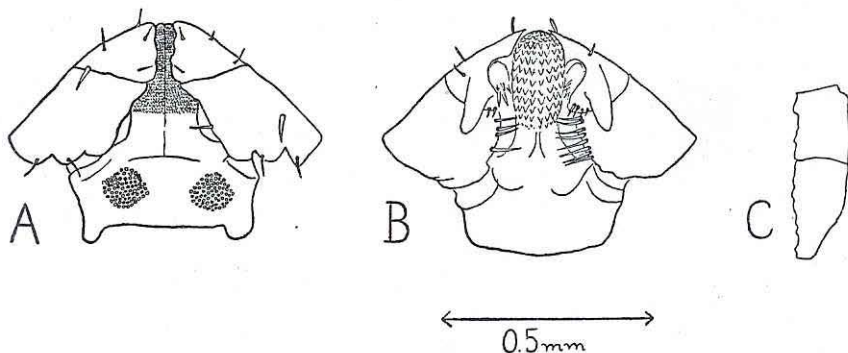


Fig. 9 *H. adleri* female: A — Capitulum dorsum, B — Capitulum venter, C — Tarsus leg IV.

resemble those of the male but meet at a less obtuse angle. The basis capituli is rectangular, cornua, well shaped, porose areas round and far apart (Fig. 9, A). The dentition of the hypostome is 4/4, 8 teeth per file. Ventrally there are no retrograde process in article 2 of the palp. Coxa I bears a strong spur, the other coxae small spurs. The genital aperture is hemispherical, parts of the inner margins of the lateral flaps are serrated, and the distance between the basis of the flaps is relatively short (Fig. 7, C).

H. adleri was found twice on jackal by Dr. I. Saturen: 3 males on 21/11/50 and 1 male and 1 female on 22/12/50 both times in Ness-Ziona. We dedicate this species to Prof. S. Adler.

HAEMAPHYSALIS ERINACEI. n. sp.

This species also resembles *H. leachi*, but differs in some important characters and should be separated as a new species.

Male.

The colour of the whole tick is tannish yellow. The scutum is oval and covered with large and scattered punctations. Its length is about 2 mm. The lateral grooves are

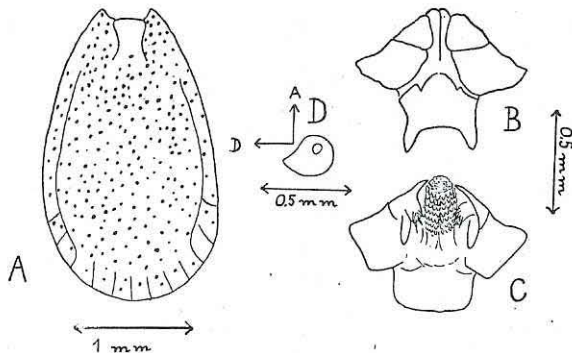


Fig. 10 *H. erinacei* male: A — Scutum, B — Capitulum dorsum C — capitulum venter D — Male spiracular plate.

long and begin at the level between coxae II and III. The palps meet anteriorly at an obtuse angle. Article two of the palp is very salient laterally and has no retrograde projections as in *H. leachi* and *H. adleri* (Fig. 10 B and C). The basis capituli is broadest in front. The cornua are long and strong. There is a strong ventral retrograde process on article 3 of the palp. The dentition of the hypostome is 4/4, 7 teeth per file. All coxae bear small spurs.

Female unknown.

Described from 1 specimen collected on hedgehog in Jerusalem on 22/7/49 by Dr. Mendelson.

The following are the keys to the species described in the present paper :

Key to Females

- 1) Article II of the palps very salient laterally; palps converge anteriorly and form a very obtuse angle; scutum covered with numerous long hairs . . . *H. adleri*
Palps only moderately salient laterally 2
- 2) Trochanters, especially of the first pair, very pilose; coxae II and III with bulges instead of spurs. *H. cretica*
Trochanters only scantily pilose; short spurs on coxae II, III, and IV . . . 3
- 3) No cornua on the basis capituli *H. punctata*
Small cornua on the basis capituli *H. otophila*

Key to Males

- 1) Article II of the palps very salient laterally 2
Article II of the palps only slightly salient laterally 3
- 2) Scutum with many long hairs *H. adleri*
Scutum without hairs; colour tanish *H. erinacei*
- 3) Coxa IV with a long spur almost as long as the coxa 4
Coxa IV with a short spur *H. otophila*
- 4) The spur on coxa IV is directed laterally; the first trochanter is very pilose . . .
. *H. cretica*
The spur on coxa IV is directed medially; the first trochanter is scantily pilose . .
. *H. punctata*

SUMMARY

The local species of the genus *Haemaphysalis* are described. *H. otophila* and *H. cretica* were found on domestic stock.

H. cretica is raised to specific status.

Two new species: *H. adleri* from the jackal and *H. erinacei* from the hedgehog are described.

A description of *H. punctata* on material from Algeria is added for comparison.

I have to thank Prof. Ed. Sergent and Dr. G.M. Kohls for the gift of material and Prof. S. Adler for advice and criticism.

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